

Connections

University of Kentucky
Biosystems & Agricultural Engineering
College of Agriculture, Food and Environment/College of Engineering



Annual Report

Vol. 12, Fall 2019

December 2, 2019

Greetings Alumni and Friends:

It's hard to believe we will be starting a new decade next month! As I look back at the past year, I'd like to focus on some of the changes in the department: new retirees, new faces, new labs and new achievements. Jayne White, so friendly and helpful to visitors and new arrivals from her desk in the main office, retired after 33 years of service. Julie Tolliver and Richard Warner, among others, shared old memories and touching stories as we celebrated Jayne's retirement this summer. Patrick Montgomery joined BAE as the new electronics engineer in June; you will read about his professional and music career in this issue's Staff Focus (opposite page). As a continuous effort of the chair's initiative, the department welcomed its largest group of graduate students, with 17 Ph.D. and 22 M.S. students, from both domestic and international origins. These graduate research assistants bring a vivid mix of diverse cultures, perspectives, and interests to the department. Last, Carmen Agouridis accepted the position of Associate Dean of Instruction, where she will practice her vision and leadership in promoting teaching excellence.

Other changes involve physical transitions, such as new uses of space and sprucing up the department. The wind tunnel in 182 was deconstructed to create a laboratory focused on precision agriculture and remote sensing. A conference room has been refurbished to better meet changing needs. A designated senior design lab gives students a clearly defined maker space. Mick Peterson received \$100,000 from NTRA Charities to establish a new UK Equine Surfaces and Safety Laboratory in Barnhart; construction will begin soon. Donnie Stamper designed new signs for all of the labs. Finally, a Fastenal® locker system for checking out vehicle keys and common tools has been installed in the printer room, satisfying Alex Fogle's request many years late.

Change will be ongoing. The department is in the process of replenishing a series of positions: three new faculty lines, a research facility manager, and more, so stay tuned. These changes, in faculty, staff, students, and new ways of using departmental space, are what drive the department forward, helping us maintain momentum and excellence as we move into the next decade.



Alpha Epsilon initiates and Dr. Shi at the first BAE Academic Showcase last spring. (Photo: Matt Barton)

Sincerely,
Jian Shi



STAFF FOCUS: PATRICK MONTGOMERY

By Donnie Stamper

Patrick Montgomery was born and raised just down the road in Jessamine County. Like many kids growing up in the Bluegrass, Patrick grew up a Kentucky basketball fan. In his teenage years Patrick became interested in music, and that long and winding road has led him to where he is today.

If you're doing the math, Jessamine County + Music + Montgomery = John Michael and/or Eddie (of Montgomery Gentry).

With his bachelor's in hand, he decided to get a master's in electrical engineering. The jump from music to physics to electrical engineering might seem odd, but Patrick has been modifying amps and pedals (effects pedals, used to modify the sound/signal coming from a guitar and other musical instruments) for many years.

Patrick is not related to the country-music star Montgomery brothers, but after graduating high school in 2008, instead of going directly to college, he attended the Lexington School for Recording Arts.

From there he spent two years as a touring guitar player for Luk Nichols. During that time he played at the CMA Festival and opened for many acts, including Thompson Square and Billy Dean.

When the music stopped, Patrick found himself enrolled at the University of Kentucky pursuing a physics degree.

Now, Patrick is the electronics engineer for our department. You can often find him in room 114 or one of several labs, working on projects for professors and students.

Outside of work, Patrick still plays music with his wife, who is the lead singer in their band, Calamity Jane. Calamity Jane is currently recording their own music, but this spring you will find them playing classic rock covers around Lexington.

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Please submit story ideas, questions, or comments to j.shi@uky.edu or karin.pekarchik@uky.edu.

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AGOURIDIS NAMED ASSOCIATE DEAN FOR INSTRUCTION IN COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

By Laura Skillman

Carmen Agouridis has been named associate dean for instruction for the University of Kentucky College of Agriculture, Food and Environment.

An extension associate professor in the UK Department of Biosystems and Agricultural Engineering, Agouridis received her bachelor's and master's degrees in agricultural and biosystems engineering from the University of Tennessee and a doctorate in that field, as well as a master's in public policy, from UK. She will receive a master's degree in business administration from UK in the spring of 2020. She brings an abundance of experience in teaching, research and outreach to her new role.

"Having been a graduate student, staff member and faculty mem-

ber in our college, Dr. Agouridis brings a great perspective to this important college leadership position," said Dean Nancy Cox. "I am confident that her passion for preparing the next generation of students for meaningful lives and careers will continue to foster the college's strong educational mission."

Agouridis is director of the Stream and Watershed Science graduate certificate and co-director of the Environmental Engineering undergraduate certificate programs. She teaches courses on stream restoration, low impact development and mine land reclamation.

Currently, she and her students are examining methods to improve instream water quality through novel stream restoration



techniques; investigating the influence of bulk density on runoff in urban landscapes; exploring alternative uses of stormwater; and evaluating the influence of the forestry reclamation approach on water quality and hydrology on mined lands.

Agouridis said she is looking forward to building on the great work of former Associate Dean Larry Grabau and the Center for Student Success. She wants to focus on continuing to improve the undergraduate and graduate education experiences.

"I look at our college as part of the wider community. We have such a big impact on the state, and I really want to build on that with our students," she said. "I want to help create opportunities for our students, so when they graduate, they leave with the best chances for success and improve our state, our country and the world. I'm really excited about that." Agouridis started her new duties Aug. 1.



Photos this page, Matt Barton, UK College of Agriculture, Food and Environment.

BAE ACADEMIC SHOWCASE

Undergraduate Excellence in Biosystems Engineering: Chris Sanders

Outstanding M.S. Student: Ciara Pickering

Outstanding Ph.D. Student: Joe Stevens

Outstanding Senior Design Team: AutoDepth (Noah Cornett, Jared Looney, Mollye Malone, Eric Vanzant)

Friends of BAE: Mark Fiedeldy; Central Equipment

Lifetime Achievement Awards: Steve Gardner; Ray Bucklin; K.C. Ting

Early Career Awards: Hana Hafer; Kathryn Plucis; Oakes Routt; Grant Wonderlich

ASABE RECAP

Outstanding Reviewer Recognition, Akinbode Adedeji

Blue Ribbon Winners: Electronic and Web-based Delivery, Carmen Agouridis and Amanda Gumbert, "Backyard Streams"

Conference Recognition, Morgan Hayes, Chair, International Livestock Environment Symposium, September 2018, Omaha, Nebraska

Incoming President's Message, Sue Nokes, ASABE President-Elect

PROMOTIONS

Joe Dvorak has been promoted to associate professor with tenure.

Michael P. Sama has been promoted to associate professor with tenure.

FACULTY AWARDS

Carmen Agouridis, extension associ-

ate professor and associate dean for instruction, has been recognized as the Kentucky Association for Environmental Education's M.K. Dickerson Outstanding Educator for 2019. Steve Higgins received the 2019 Conservationist of the Year award from the Kentucky Association of Conservation Districts - Division of Conservation.

Eden Shale Farm received the Environmental Pacesetter Award from the Department for Environmental Protection for Steve Higgins' work emphasizing environmental stewardship and best management practices.

Sue Nokes, professor and associate dean for faculty affairs and facilities, received the honor of 2019 Outstanding Alumnus for the Department of Biological and Agricultural Engineering at North Carolina State University. She completed her Ph.D. there in 1990.

PUBLICATIONS

Adedeji, A. A. (2019). Challenges and discovery of best practices for teaching engineering to food science majors – my experience over my first five years at the University of Kentucky. *Journal of Food Science Education – Letter to the Editor*. Accepted October 31st, 2019. Impact Factor: 0.15

Akharume, F., Santra, D and Adedeji, A.A. Physicochemical and functional properties of proso millet storage protein fractions. *Food Hydrocolloids*. Accepted on November 5, 2019. <https://doi.org/10.1016/j.foodhyd.2019.105497>. Impact Factor: 5.839.

Bailey, S.C., Canter, C.A., Sama, M.P., Houston, A.L., Smith, S.W. 2019. Unmanned Aerial Vehicles Reveal Impact of Total Solar Eclipse on Atmospheric Surface Layer. *Proceedings of the Royal Society A*. 475:20190212. Impact Factor: 4.304.

Bosomtwe, A., J.K. Danso, E.A. Osekre, G.P. Opit, G. Mbata, P. Armstrong, F.H. Arthur, J.F. Campbell, N. Manu, S. G. McNeill, and J.O. Akowuah. (2019). Effectiveness of the solar biomass hybrid dryer for drying and disinfestation of maize. *J. Stored Prod. Res.* 83: 66-72. doi:10.1016/j.jspr.2019.05.011.

Casada, M. E., S.A. Thompson, P.R. Armstrong, S.G. McNeill, R.G. Maghirang, M.D. Montross, A.P. Turner. (2019). Forces on monitoring cables during grain bin filling and emptying. *Applied Engineering in Agriculture*, 35(3), 409-415. www.asabe.org

Chambers, E., Maughan C., Pad-



manabhan, N., Alavi, S. and Adedeji, A. (2019). Sensory Analysis of 20% solids fortified blended porridge. *British Food Journal* 121(2), 633 - 641. <https://doi.org/10.1108/BFJ-05-2018-0280> Impact Factor: 1.717.

Egert-McLean, A.M., Sama, M.P., Klotz, J.L., McLeod, K.R., Kristensen, N.B, Harmon, D.L. P 2019. Automated System for Characterizing Short-Term Feeding Behavior and Real-Time Forestomach Motility in Cattle. *Computers and Electronics in Agriculture*. Vol. 167, 105037. Impact Factor: 3.171.

Ford, WI, Husic, A, Fogle, A, Taraba, J. Long-term assessment of nutrient flow pathway dynamics and in-stream fate in a temperate karst agroecosystem watershed. *Hydrological Processes*. 2019; 1– 19. <https://doi.org/10.1002/hyp.13427>

Franke-Dvorak, T. C., & Nokes, S. E. (2019). An Assessment of Agricultural Science Teachers' Knowledge of Biotechnology and Experience through Piloting New Biotechnology Curriculum. Poster for the American Association for Agricultural Education (AAAE) Southern Region Conference, Birmingham, AL, February 2-5, 2019.

Rady, A, Giaretta, A., Ruwaya, M., Dev, S., and Adedeji A. A. (2019). Effect of pretreatments and freezing rates on physical, nutritional and microstructural properties of fried sweet potato. *Transactions of ASABE* 62(1), 1-15. Accepted on November 16, 2018. <https://doi.org/10.13031/trans.1309>. Impact Factor: 1.118. 6.

Rahimi, J., Adedeji, A.A. and Ngadi, M.O. (2019). The influence of batter formulation and pre-drying time on inter-particle space fractions of a coated meat analog. *Journal of Texture Studies*. Accepted on May 21, 2019. <https://doi.org/10.1111/>

jtxs.12448. Impact factor: 1.591. Turner, A.P., Sama, M.P., McNeill, S.G., Dvorak, J.S., Mark, T.B., Montross, M.D. 2019. A Discrete Event Simulation Model for Analysis of Farm Scale Grain Transportation Systems. *Computer and Electronics in Agriculture*, Vol. 167, 105040. Impact Factor: 3.171.

Stevens, J., J. Shi. Biocatalysis in Ionic Liquids for Lignin Valorization: Opportunities and Recent Developments. *Biotechnology Advances*. Accepted.

Whitford, F., B. Drummy, J. Earnest, Jr., M. Templeton, T. Johnson, and K. L. Smith. 2019. Learning from Truck and Equipment Collisions. *Purdue Extension No. PPP-127*. Purdue University, West Lafayette, IN. 45 p.

Woomer, J., Singh, M., Vijayakumar, P.P. and Adedeji, A.A. (2019). Physical properties and organoleptic evaluation to determine consumer acceptance of millet-based gluten-free bread from proso millet. *British Food Journal*. Accepted: October 26, 2019. <https://doi.org/10.1108/BFJ-07-2019-0555>. Impact Factor: 1.717

STAFF AWARDS

Tanya C. Dvorak's proposal for a Kentucky NSF EPSCoR Mini-Grant, "Providing STEM Education with a Sustainable Outlook to Youth," has been selected for funding.

GRADUATE STUDENT AWARDS

Gabriel Abdulai (Advisors: Jackson/Sama) received the ASABE Nye Graduate Fellowship, which encourages underrepresented minority graduate student members of ASABE to pursue degrees in agricultural and biological engineering.

Felix Akharume (Advisor: Adedeji) placed in the ASABE Oral/Poster Competition within the PRS techni-

cal community for his work entitled, "Numerical Simulations and Experimental Validation Study of a Mixed-mode Solar Dryer for Cocoa Beans," presented during the ASABE AIM in Boston.

Gina DeGraves (Advisor: Ford) and Ciara Pickering (Advisor: Ford) were each recipients of a Most Outstanding Graduate Poster Presentation at the Kentucky Water Resources Research Institute's annual symposium.

Ryan Kalinoski (Advisor: Shi) placed in the ASABE Oral/Poster Competition within the ES & ESH technical community for his work entitled, "Antimicrobial Properties of Lignin Derivatives from Thermochemical Depolymerization," presented during the ASABE AIM in Boston.

Staci McGill (Advisor: Hayes) placed in the ASABE Oral/Poster Competition within the PAFS technical community for her work entitled, "Air speed to increase rate of cool out for horses after intense exercise," presented during the ASABE AIM in Boston.

Joe Stevens (Advisor: Shi) is attending the National Supercomputing Conference in Denver in November after winning a free trip during the third annual Commonwealth Computational Summit.

UNDERGRADUATE STUDENT AWARDS

Spencer Givan received a Co-op/Intern of the Year Award from the UK College of Engineering following his internship with Bel Brands.

Quarter-scale tractor team captain Courtney Travis was selected to receive the ASABE William J. Adams, Jr. & Marijane E. Adams Scholarship.

BAE By the Numbers

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| 2018-2019 Enrollment | | | | | |
|----------------------|------------|-----------|-----------|------------|------------------|
| | Total | Female | Male | Minorities | African American |
| Bachelor's | 157 | 78 | 79 | 12 | 2 |
| Master's | 13 | 4 | 9 | 0 | 0 |
| Doctoral | 12 | 1 | 11 | 1 | 1 |
| Post-Doc | 0 | 0 | 0 | 0 | 0 |
| Total | 182 | 83 | 99 | 13 | 3 |

| Enrollment Five-Year Trend | | | | | |
|----------------------------|------------|------------|------------|------------|------------|
| | 2014-2015 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 |
| Bachelor's | 168 | 203 | 195 | 152 | 157 |
| Master's | 22 | 14 | 13 | 18 | 13 |
| Doctoral | 10 | 10 | 10 | 9 | 12 |
| Post-Doc | 1 | 2 | 2 | 2 | 0 |
| Total | 201 | 229 | 220 | 181 | 182 |

| 2018-2019 Degrees Awarded | | | | | |
|---------------------------|-----------|-----------|-----------|------------|------------------|
| | Total | Female | Male | Minorities | African American |
| Bachelor's | 42 | 16 | 26 | 5 | 1 |
| Master's | 9 | 4 | 5 | 1 | 0 |
| Doctoral | 2 | 0 | 2 | 0 | 0 |
| SWS Certificate | 3 | 1 | 2 | 0 | 0 |
| Total | 53 | 20 | 33 | 6 | 1 |

| Degrees Awarded Five-Year Trend | | | | | |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|
| | 2014-2015 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 |
| Bachelor's | 27 | 33 | 26 | 39 | 42 |
| Master's | 9 | 5 | 9 | 2 | 9 |
| Doctoral | 1 | 3 | 0 | 3 | 2 |
| SWS Certificate | 4 | 7 | 4 | 4 | 3 |
| Total | 37 | 41 | 35 | 44 | 53 |

BAE By the Numbers

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| Awards, 2019-2020 YTD | | | |
|---|------|---|--------------------|
| BAE Principal Investigator | Year | Agency | Amount |
| Nokes, Sue, Shi, Jian (Co-I) | 2019 | Louisiana State University | \$500,000 |
| Nokes, Sue, Shi, Jian (Co-I) | 2020 | Louisiana State University | \$500,000 |
| Adedeji, Akinbode | 2020 | USDA NIFA | \$473,989 |
| Adedeji, Akinbode | 2020 | USDA NIFA | \$440,416 |
| Agouridis, Carmen | 2019 | LFUCG | \$299,400 |
| Colliver, Donald | 2019 | Dept. of Energy | \$269,635 |
| Higgins, Stephen | 2019 | KY Dept. of Environmental Protection Agency | \$138,000 |
| Colliver, Donald | 2020 | Dept. of Energy | \$130,000 |
| McNeill, Sam, Montross, Michael (Co-I), Overhults, Douglas (Co-I) | 2019 | Rural Development | \$99,976 |
| Higgins, Stephen | 2020 | KY Energy and Environment Cabinet | \$27,397 |
| Ford, William | 2019 | US Dept. of Agriculture | \$25,000 |
| McNeill, Sam | 2019 | Oklahoma State University | \$11,766 |
| McNeill, Sam | 2019 | Foreign Agricultural Service | \$11,499 |
| | | | \$2,427,078 |

| Collaborative Awards, 2019-2020 YTD | | | |
|---|------|-------------------------------|---------------------|
| BAE Co-Investigator/Sub-Contract | Year | Agency | Amount |
| Crofcheck, Czarena | 2019 | NSF | \$4,000,000 |
| Crofcheck, Czarena | 2020 | NSF | \$3,820,364 |
| Agouridis, Carmen | 2020 | NSF | \$2,998,456 |
| Purschwitz, Mark | 2019 | NIOSH | \$1,448,399 |
| Purschwitz, Mark | 2020 | NIOSH | \$1,440,783 |
| Sama, Michael | 2020 | NSF | \$1,199,150 |
| Edwards, Dwayne | 2019 | NRCS | \$1,169,831 |
| Purschwitz, Mark | 2019 | NIOSH | \$1,009,308 |
| Adedeji, Akinbode (Co-project director) | 2020 | University of Maine | \$747,328 |
| Edwards, Dwayne | 2020 | KY Soybean Promotion Board | \$206,003 |
| Edwards, Dwayne | 2019 | KY Soybean Promotion Board | \$200,047 |
| Sama, Michael | 2019 | KY Corn Growers Association | \$100,000 |
| Agouridis, Carmen, William, Ford | 2019 | US Geological Survey | \$92,335 |
| Edwards, Dwayne | 2019 | LFUCG | \$35,000 |
| Stombaugh, Timothy | 2020 | KY Small Grain Growers Assoc. | \$18,576 |
| Stombaugh, Timothy | 2019 | KY Small Grain Growers Assoc. | \$16,122 |
| | | | \$18,501,702 |

BAE By the Numbers

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| FACULTY BY TITLE SERIES | |
|-------------------------|-----------|
| Regular faculty | 11 |
| Extension | 7 |
| Lecturer | 1 |
| Part-time instructors | 6 |
| Post-retirement | 3 |
| TOTAL | 28 |

| FULL-TIME FACULTY BY RANK | |
|------------------------------|-----------|
| Professor | 8 |
| Professor and Associate Dean | 3 |
| Associate | 2 |
| Assistant | 5 |
| Lecturer | 1 |
| TOTAL | 19 |

| FULL-TIME FACULTY BY GENDER | |
|-----------------------------|----|
| Female | 5 |
| Male | 14 |

| FULL-TIME FACULTY BY RACE | |
|---------------------------|----|
| African American | 2 |
| Asian | 1 |
| White | 16 |



Students in the new Senior Design Lab. (Photos, Eric Sanders, UK College of Engineering.)

BAE By the Numbers

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IMPACTS 2018-2019

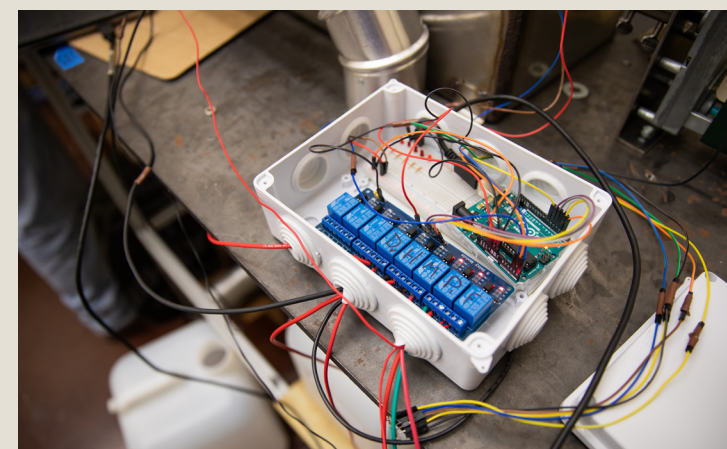
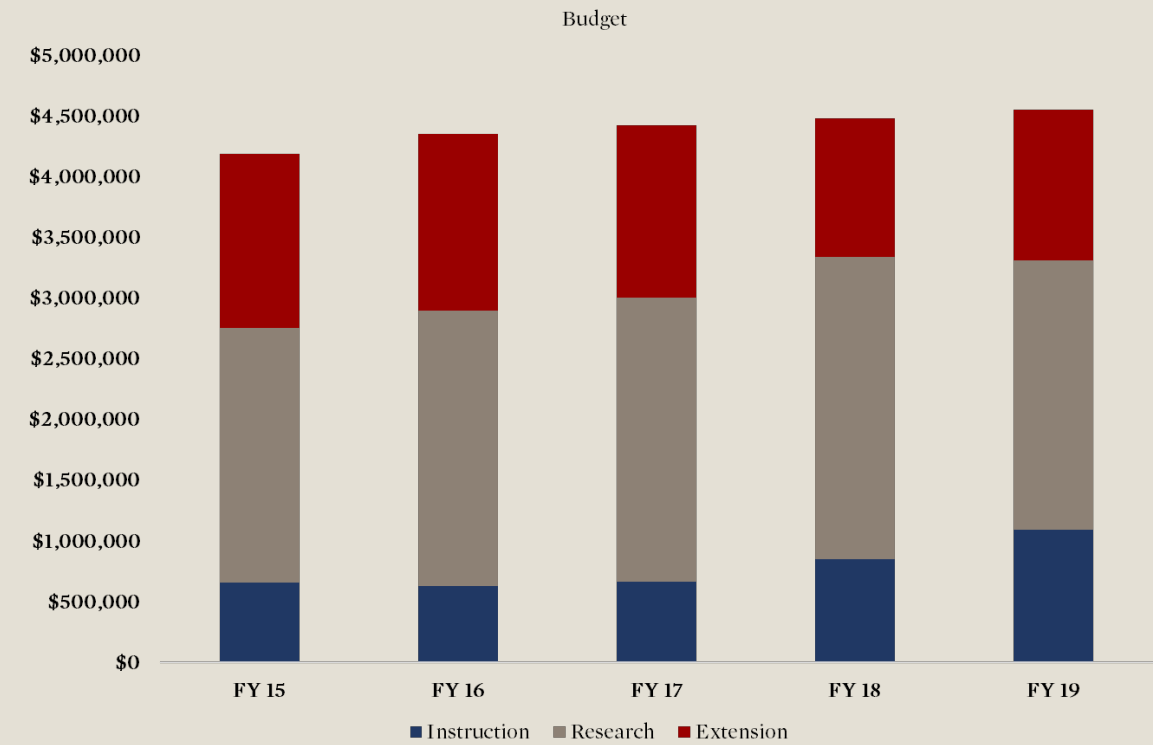
| | |
|---------------------------------------|--------|
| Refereed journal articles | 26 |
| Book chapters | 1 |
| Podcast | 1 |
| Interdisciplinary programming | 3 |
| Conference/committee leadership roles | 8 |
| Extension fact sheets | 10 |
| Extension Success Stories | 11 |
| Extension contacts | 29,394 |

Below, a poster session during the LA-KY Joint EPSCoR RII, Track 2 NSF Grant Annual Conference, held at UK in August 2019. (Photo, Tanya C. Dvorak.) Opposite (top and bottom), senior design students and a project in progress. (Photos, Eric Sanders). Opposite (far right), dismantling the wind tunnel. (Photo, Donnie Stamper.)



BAE By the Numbers

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BAE By the Numbers

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| RECOGNITIONS 2018-2019 | | |
|--------------------------|---|---|
| Akindbode Adedeji | Outstanding Associate Editor | ASABE |
| Akindbode Adedeji | Outstanding Reviewer | ASABE |
| Alicia Modenbach | Outstanding BAE Teacher Award | UK College of Engineering |
| Carmen Agouridis | Blue Ribbon Winner, Electronic & Web-based Delivery, "Backyard Streams" | ASABE |
| Carmen Agouridis | M.K. Dickerson Outstanding Educator | Kentucky Assoc. for Environmental Education |
| Carmen Agouridis | Wethington Award | UK |
| Czarena Crofcheck | Wethington Award | UK |
| Don Colliver | Wethington Award | UK |
| George (and Ruth) Duncan | Hall of Fame | National 4-H |
| George Duncan | Hall of Distinguished Alumni | UK College of Agriculture, Food and Environment |
| Jian Shi | AOCABFE Early Career Award | Association of Overseas Chinese Agricultural, Biological and Food Engineers |
| Jian Shi | Wethington Award | UK |
| Joseph Dvorak | Gold Quill Award | American Society of Farm Managers and Rural Appraisers |
| Joseph Dvorak | Wethington Award | UK |
| Michael Montross | Wethington Award | UK |
| Michael P. Sama | 3 Superior Paper Awards | ASABE |
| Michael P. Sama | Wethington Award | UK |
| Morgan Hayes | Conference Recognition, International Livestock Environment Symposium | ASABE |
| Samuel McNeill | Wethington Award | UK |
| Steve Higgins | Conservationist of the Year | Kentucky Association of Conservation Districts- Division of Conservation |
| Steve Higgins | Environmental Pacesetter Award | Kentucky Department of Environmental Protection |
| Steve Higgins | Pioneer Award | Kentucky Beef Network |
| Sue Nokes | Outstanding Alumnus | Dept. of Biological & Agricultural Engineering, NC State University |
| Sue Nokes | President | ASABE |
| Sue Nokes | Wethington Award | UK |
| William Ford III | Wethington Award | UK |

Photographs on the opposite page were taken by Matt Barton (UK College of Agriculture, Food and Environment) during the first annual BAE Academic Showcase, held at Spindletop Hall.



Bioenvironmental

Engineers in this area study surface water hydrology, groundwater hydrology, sediment transport, water quality, chemical rate and transport, waste management, reclamation of disturbed lands, site remediation, irrigation and drainage.



CARMEN AGOURIDIS

Associate Dean for Instruction in the College of Agriculture, Food and Environment,
Extension Associate Professor

Graduate Research Assistants:

Jonathan Brantley (M.S.)
Cole Crankshaw (M.S.)



DWAYNE EDWARDS

Professor

Graduate Research Assistants:

Drew McGill (M.S.)
Colton Pugh (M.S.)



WILLIAM FORD 3RD

Assistant Professor

Graduate Research Assistants:

Saeid Nazari (Ph.D.)
Rozalia Agioutanti (M.S.)
Nolan Bunnell (M.S.)
Gina DeGraves (M.S.)
Ciara Pickering (M.S.)
Cory Radcliff (M.S.)

Controlled Environment

Engineers in this area study heat and mass transfer, physics of plant and animal environments, biometeorology, structural design, air quality, heating, ventilation and air-conditioning design.



DONALD COLLIVER

Fellow and Presidential Member, ASHRAE, Professor, and Director of Graduate Studies

Graduate Research Assistants:

Katie Estep (M.S.)



MORGAN HAYES

Extension Assistant Professor

Graduate Research Assistants:

Staci McGill (Ph.D.)



JOSHUA JACKSON

Extension Assistant Professor

Graduate Research Assistants:

Gabriel Abdulai (Ph.D.)
Gary Lopez (M.S.)

19 Faculty **3** Associate Deans **5** Female Faculty

6 Extension Faculty **3** Fellows (ASABE, ASHRAE, Carnegie)

Food and Bioprocessing

Engineers in this area receive extensive training in microbiology, biochemical engineering, heat and mass transfer, enzyme kinetics and fermentation, storage of biological products and materials handling.



AKINBODE ADEDEJI

Assistant Professor Food Process Engineering

Graduate Research Assistants:

- Felix Akharume (Ph.D.)
- Nader Ekramirad (Ph.D.)
- Abuchi Okeke (M.S.)



CZARENA CROFCHECK

Associate Dean for Academic Affairs, Lewis Honors College, Professor

Graduate Research Assistants:

- Julia Parker (M.S.)



SAMUEL MCNEILL

Extension Professor

Graduate Research Assistants:

- Michael Omodara (Ph.D.)

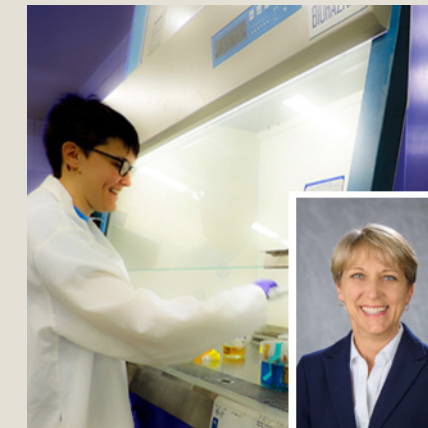


MICHAEL MONTROSS

Professor and Department Chair

Graduate Research Assistants:

- Michael Omodara (Ph.D.)
- Toby Adjuik (Ph.D.)

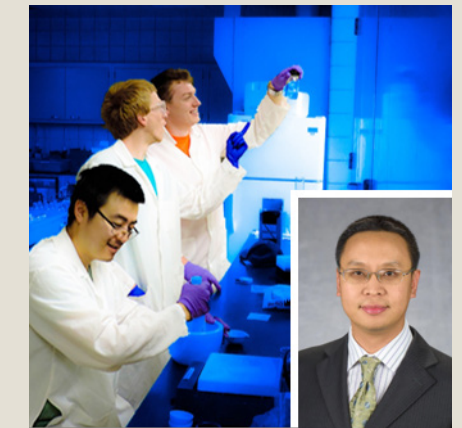


SUE NOKES

Associate Dean for Faculty Affairs and Facilities, Professor

Graduate Research Assistants:

- Toby Adjuik (Ph.D.)
- Rilwan Oyetunji (Ph.D.)
- Gary Lopez (M.S.)



JIAN SHI

Assistant Professor

Graduate Research Assistants:

- Ryan Kalinoski (Ph.D.)
- Wenqi Li (Ph.D.)
- Can Liu (Ph.D.)
- Joe Stevens (Ph.D.)
- Yuxuan Zhang (Ph.D.)
- Jameson Hunter (M.S.)
- Makua Vin-Nnajofofor (M.S.)

3 Degree Options **6** Undergraduate Areas of Study

4 Student Organizations **53,000** Sq. Ft. of Labs

Machine Systems Automation

Engineers in this area work with fundamental concepts including system dynamics, kinetics, automated controls, machine design, kinematics, fluid power, soil dynamics, plant-machine interactions and digital electronics.



JOSEPH DVORAK

Associate Professor, Director of Undergraduate Studies

Graduate Research Assistants:

- Navab Karimi (Ph.D.)
- Bo Smith (M.S.)
- Tucker Sheffield (M.S.)



MICHAEL P. SAMA

Associate Professor

Graduate Research Assistants:

- Gabriel Abdulai (Ph.D.)
- Karla Ladino (Ph.D.)
- Shawn O'Neal (M.S.)
- Felipe Pampolini (M.S.)



TIMOTHY STOMBAUGH

Extension Professor

Additional Areas:

Engineering Education Animal Biomechanics Agricultural Safety and Health



ALICIA MODENBACH
Lecturer, Student Services Coordinator



MICK PETERSON
Professor

Graduate Research Assistants:

- Peter Schmitt (Ph.D.)



MARK PURSCHWITZ
Extension Professor

\$20M Primary & Collaborative Grants 2019-20 YTD

22 Wildcat Pulling Teams **1** AgWeather Center

182's *New* Direction



Lab 182 has been used for controlled environment research since the department moved into the building in 1990. Most recently it housed a wind tunnel used for compost-bedded pack barn design and testing airflow measurement systems, along with a few other experiments tucked in the corners. This past semester the transformation of the space into a Precision Agriculture and Remote Sensing Laboratory began. The lab, roughly 2,000 square feet, serves as a space for conventional experiments and system development. Current projects include a spray deposition system for measuring volumetric flow rate under advanced control methods, a high-throughput soil sampling system with a custom spectral measurement system for quantifying soil parameters in the field, and a CNC router table transferred from the Mechanical Engineering department. The three-story high ceilings also make the lab an ideal space for indoor flight testing of drones.

Student Spotlight: Joe Stevens

Where are you in your graduate program, and how is UK preparing you for your career?

I am in my fourth and final year of my Ph.D. program at UK. I've really developed a passion for research during the last few years at UK. I'm hoping to get a job working in a national lab once I graduate. They are great places to do research; very collaborative environments but very challenging research. I feel as though the last few years have prepared me for this exact kind of workplace.

You received a Chateaubriand Fellowship. Tell us about your nine months conducting research in France.

I lived with a host family, the Bergoniers, in the south of France for nine months this year while working at the Toulouse Biotechnology Institute (TBI). I did really neat research for my dissertation, I traveled a whole lot, I met up with old friends,

The Pyrenees in Soldeu, Andorra.



made some new friends, and I ate a lot of really good food.

Who did you work with? Was it similar to working in a lab here?

I primarily worked with Dr. Claire Dumon, who was the head of the Lignocellulase group at TBI, but I had a lot of help from other students and researchers in her group. Dr. Cédric Montanier, Dr. Régis Faure, Thomas Enjalbert, and Jiao Zhao were all hugely helpful. The last three months I also worked closely with the Modeling and Simulations group headed by Dr. Isabelle André. Dr. Jérémy Esque spent a lot of time helping me with protein modeling, docking, and molecular dynamics simulations. Everyone was very patient and very kind while working with me. I asked a lot of everyone there and they spent so much time helping me, I'm very lucky. It was basically the same as working in a lab here, but everyone was speaking French!

What was your favorite



Cooking some squid and sea bass with Dominique when my American family was visiting.

part of studying in France?

I was able to do research that I would not have been able to do here at UK. That's not to say that the research environment here is terrible, quite the opposite. It just so happens that my personal research interests have developed in such a way that I had to look outside of UK to do the work I wanted for my dissertation.

What was your least favorite part of it?

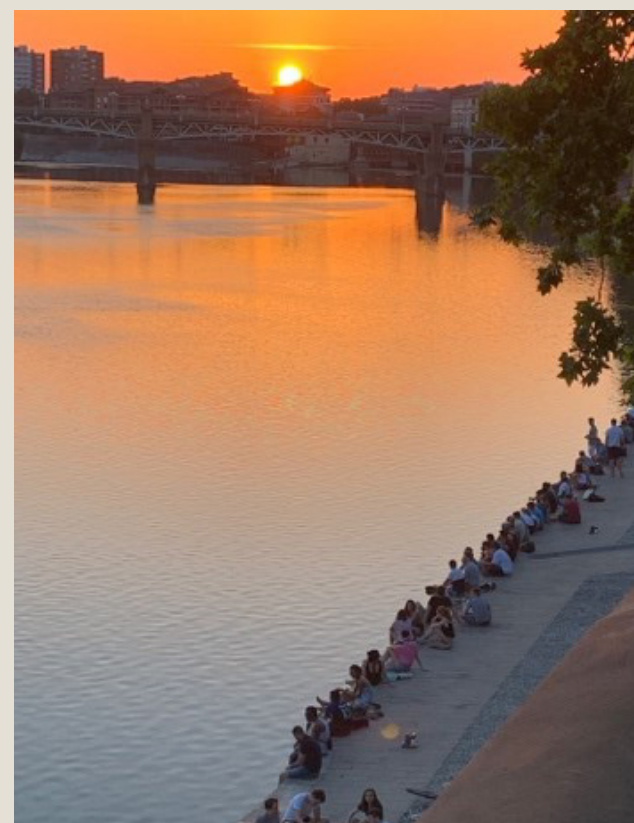
Starting from scratch. There's an analogy I've been using when describing what it was like when I first started working there: I had just started to run at UK before I left for France, but when I got to France they told me I hadn't even learned how to crawl correctly. I learned that a lot of the work I had done the past year at UK was not done in such a manner that could be

published, which was certainly frustrating. Having redone that work, however, I feel much more confident about publishing and presenting the work.

While you were in Toulouse, what was a typical day or week like?

Not too different from a typical day in the U.S. I woke up, exercised or did yoga, had coffee and breakfast, then went to work. It took about an hour to get to work, between walking and taking the metro. That gave me plenty of time to listen to music and plan my work for the day. On the way home I would stop at the grocery store (and sometimes the *boulangerie*) to get ingredients for dinner. Then I'd go home and cook dinner, talk to my host family if I saw them, then go to bed. Between working and commuting I

Sunset on the Garonne River in Toulouse.



didn't have a lot of free time during the day. Weekends were spent traveling, walking around the old part of Toulouse, and cooking with my host family for Sunday lunches.

What were some of the cultural similarities or differences?

I think the biggest difference is how slow they take everything. While everyone likes to eat, drink, and be merry in the U.S., in France they like to eat...drink...be merry...eat some more...drink some more...be merry some more...and drink some more. It's the same thing, just on a different time scale.

What were some of the academic similarities or differences?

In France they have an academic system called *trois-cinq-huit* (3-5-8). It takes three years to get a bachelor's degree, five years to get a master's degree, and eight years to get a Ph.D. They also require students to take study-abroad trips during college, which is only mandatory at some colleges in the U.S. Otherwise, it is pretty much the same.



Definitely not posing for pictures with Claire.

Did French food live up to your expectations?

The food was very good! There was a lot of *foie gras*, good wine, and good seafood. The access to good bread was just insane, every corner had its own little bakery selling fresh *baguettes* or *croissants* for 1€, which was amazing. There was a huge market in the middle of Toulouse, the *Marché Victor Hugo*, which sold all kinds of produce and meats and fish and breads. Above the market there were restaurants that cooked the food from the market below. Absolutely great food for dirt cheap.

Did you travel? Where to? What was your favorite place?

I think I ended up traveling every other weekend I was there. Here's a list of all of the places I traveled: Milan (Italy), Madrid (Spain), Copenhagen (Denmark), London (England), Paris (France), Albi (France),

Bayonne (France), Biarritz (France), Lourdes (France), Soldeu (Andorra), Vigo (Spain), Santiago (Spain), Brussels (Belgium). I cooled it on the traveling my last couple months there so I could focus on research. Vigo was probably my favorite. We have family friends who live there, and I stayed with the *abuela*, or grandmother, of this family. She lived in a house close to the beach and had fruit trees in her backyard. It was really relaxing, and the family gave me a tour of all of these little fishing villages up and down the coast of Vigo. I also speak a lot of Spanish, so it was nice to have conversations with people in their native language and not in English.

What impacts did this fellowship have on you, professionally and/or personally?

Before this experience, I was really debating whether or not I wanted to spend my life doing research. I've enjoyed graduate school and the research, but I like doing so many other things outside of research. I enjoy

Last dinner in France with friends.



cooking, traveling, and all things coffee and I really wasn't sure if I was willing to sacrifice those things for research. It wasn't until I had two weeks left in France that I realized that the only reason I've been able to cook, travel, and drink coffee all across Europe is because of research! If anything, this experience has reassured me that my life is on a good path.

Do you have any advice for students who want to study abroad?

Do it! It sounds clichéd but traveling and living in a foreign country has really opened my eyes to the world. It's also made me so much more confident. I never would have thought myself capable of doing everything I did this past year.

Do you hope to go back to France?

Certainly! I made a lot of great friends in Toulouse that I mean to visit in the future. I'm also not limiting myself to working in the U.S. anymore. There are a lot of great work opportunities in Europe.

What advice would you give to current and future students?

Three quotes that I've found incredibly useful the last few years:

"Keep your head up in failure and your head down



Saturday morning market in Bayonne, France. (All photos, Joe Stevens.)

in success." – Jerry Seinfeld

"True confidence is living in uncertainty." – Advice given to and shared by Jonah Hill

"It gets easier. Every day it gets a little easier. But you gotta do it every day – that's the hard part. But it does get easier." – The Jogging Baboon from BoJack Horseman

What are your plans for the near and distance future?

Keep doing exactly what I've been doing in graduate school: traveling, researching, eating food, and drinking coffee. I plan on defending in the summer and getting a job out west, hopefully in Colorado. In the distant future, who knows? Maybe I'll own a coffee roasting company. Some towns I visited in Europe could use a good coffee shop, but I haven't thought about that too much.

Alumni Spotlight: K.C. Ting

RECIPIENT OF A UK BAE LIFETIME ACHIEVEMENT AWARD

K.C. Ting, a recipient of one of three lifetime achievement awards bestowed at the University of Kentucky BAE Academic Showcase in 2019, is a Vice Dean of International Campus, ZJU and Professor, ZJUI. The Zhejiang University-University of Illinois at Urbana-Champaign Institute (ZJUI) is a joint engineering college on the Zhejiang University International Campus in Haining, China.

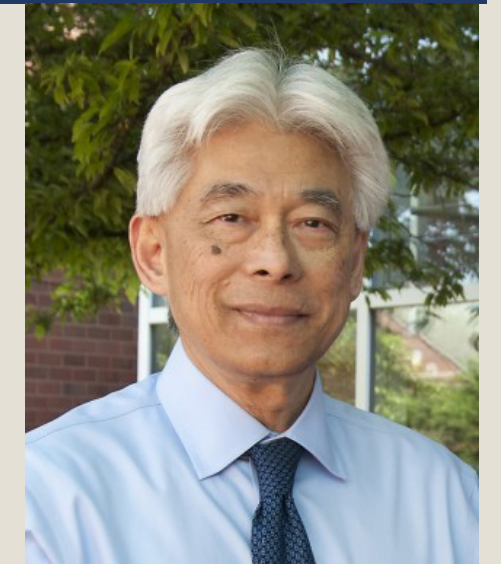
K.C. Ting graduated from the National Taiwan University with a B.S. degree, the University of Kentucky with an M.S., and the University of Illinois with his Ph.D. All three degrees are in Agricultural Engineering.

He served as chair of the Mechanical Engineering Technology Department at the University of Houston during 1984-85, director of the Bioresource Engineering Graduate Program at Rutgers University during 1986-93, chair of the Bioresource Engineering Department, Rutgers University during 1993-1999, and chair of the Department of Food, Agricultural and Biological Engineering at The Ohio State University during 2000-2004. He joined the University of Illinois at Urbana-Champaign as Professor and Head of the Agricultural and Biological

Engineering Department on November 1, 2004.

He holds a professional engineer license in New Jersey. He has been invited to deliver over 90 presentations (many of them were keynotes) at conferences and workshops in many countries and, in many cases, he also served as a member of the organizing committees. He has hosted many international visiting scholars at Rutgers University, The Ohio State University, and the University of Illinois. He has served on several external review teams to evaluate academic and research programs at the college and department levels. He served as a member of the Publications Council of ASAE during 1997-2003 and is currently a member of the Board of Trustees of ASABE Foundation. He is a member of seven honorary societies. He has been a member of ASME and ASABE since 1980. He was elected to Fellow of ASABE in July 2001 and to Fellow of ASME, International (American Society of Mechanical Engineers) in July 2002. He was a recipient of the ASABE 2008 Kishida International Award and 2011 James R. and Karen A. Gilley Academic Leadership Award.

He has served as an engineering consultant for several companies in the U.S. and Taiwan, an adviser on Taiwan agricultural automation and controlled environment plant production systems projects, an



advisor for the Mie University Advisory Program in Japan, and an Honorary Scientist for the Korean Rural Development Administration. He is a member of the African Scientific Committee for establishment of future African Institutes of Science and Technology.

He has a patent on a robotic end-effector for transplanting of seedlings. He is a recipient of three best paper awards. He was the 1997 Alpha Zeta Professor of the Year of Cook College, Rutgers University. He was appointed guest chair professor of Zhejiang University, Hangzhou, China in 2006 and Honorary Professor of the National Bio-Environment Engineering Laboratory of the Ministry of Agriculture, China Agricultural University, Beijing, China, in 1996.

Additionally, he participated as a fellow of Food Systems Leadership Institute during 2006-2008.

THANK YOU TO OUR GENEROUS SUPPORTERS

As 2019 comes to an end, it is clear the Department of Biosystems and Agricultural Engineering has much to celebrate. Our successes would not be possible without the hard work of our outstanding students, faculty, and staff. Gifts from alumni and friends support these individuals as they continue their good work. We hope you will join the generous donors who contribute to our accomplishments each year. Gifts can be made online to the Biosystems and Agricultural Engineering Enrichment Fund at ca.uky.edu/give or through the Office of Philanthropy and Alumni at 859-257-3814.

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BAE's Alumni Advisory Board meets twice a year, in the spring and fall. The group offers valuable feedback on the department's academic, extension, outreach, and research programs.

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Academic Showcase

Please join the Department of Biosystems and Agricultural Engineering as we honor students, alumni, and friends.

April 16, 2020 | 5:30-8pm | Spindletop Hall

5:30-6:00 Check In and Photos
6:00-7:00 Reception and Showcase
7:15 Program

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